

VARIABLE VALVE TIMING PROGRAM

1

The most comprehensive VVT line in the aftermarket now features more than 650 VVT Solenoids, Sprockets and Kits

2

Our advanced engineering and manufacturing processes deliver premium-quality VVT components

3

Many Standard® and Blue Streak® VVT components include gaskets and seals where required for an complete repair

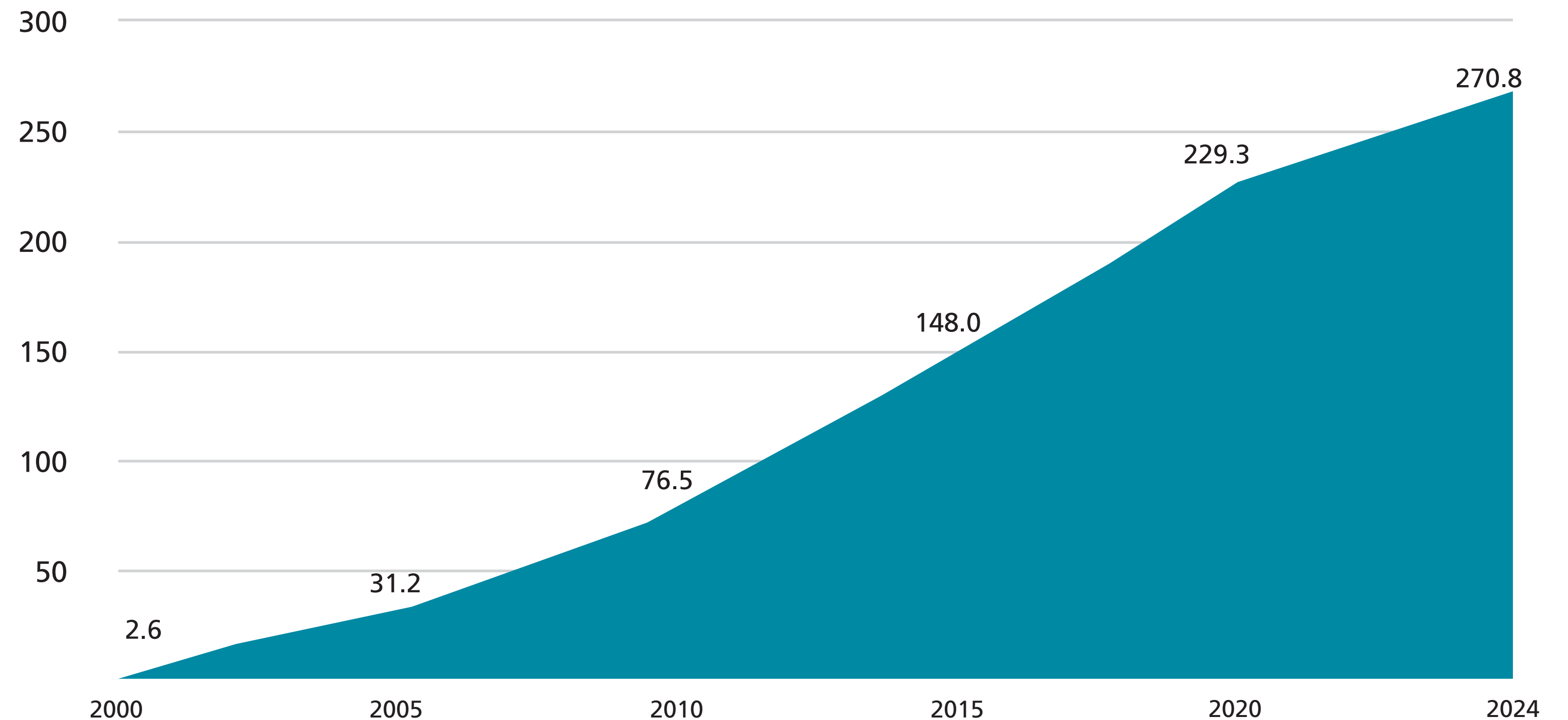
**What's in your box?™
Here's what's in ours.**



Growing Market

Almost every new vehicle with an internal combustion engine is now equipped with variable valve timing. There are already more than 270 million VVT-equipped vehicles on the road and they are getting older each day. As an industry that generally services 8-15 year old vehicles, the future for VVT maintenance and repair is bright.

Registered Vehicles with Variable Valve Timing
(in millions)



From 2015 to 2024, the number of vehicles on the road with variable valve timing grew by over 120 million! Service opportunities will see significant growth as these vehicles age.



Source: SMP Internal Data



Variable Valve Timing

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Opportunities

The VVT components on the Ford 5.4L are known for their high failure rates. Ford has even released a Technical Service Bulletin on this topic and recommends replacing the VVT solenoids when there is a rattling noise or a rough idle.

5.4L 3V – INTERMITTENT RATTLE NOISE WHILE DRIVING / ROUGH IDLE WHEN ENGINE IS AT OPERATING TEMPERATURE

TSB 14-0114

FORD:
2004-2010 F-150
2005-2010 F-250, F-350
2005-2013 Expedition
LINCOLN:
2006-2008 Mark LT
2005-2013 Navigator

This article supersedes TSB 12-7-10 to update the vehicle model years and Service Procedure.

ISSUE
Some 2004-2010 F-150, 2005-2010 F-Super Duty 250/350, 2005-2013 Expedition, Navigator and 2006-2008 Mark LT vehicles equipped with 5.4L 3V engine may exhibit an intermittent rattle noise while driving from idle up to 1200 RPM when the engine is at operating temperature. In severe cases, a rough idle and diagnostic trouble codes (DTCs) P0022, P0021, P0340, and/or P0341 may be stored in the powertrain control module (PCM).

ACTION
Follow the Service Procedure steps to correct the condition.

SERVICE PROCEDURE
Replace the left and right variable cam timing (VCT) solenoids. Refer to Workshop Manual (WSM), Section 303.

PART NUMBER	PART NAME
8L3Z-6M280-B	VCT Solenoid
7L1Z-6584-B	Left Side Cam Cover Gasket—14 Bolt Cam Cover
7L1Z-6584-A	Right Side Cam Cover Gasket—8/9 Bolt Cam Cover
3L3Z-6584-EA	Right Side Cam Cover Gasket—14 Bolt Cam Cover
3L3Z-6584-DB	Left Side Cam Cover Gasket—15 Bolt Cam Cover
3L3Z-6C535-AA	VCT Solenoid To Cam Cover Gasket

OPERATION	DESCRIPTION	TIME
140114A	2005-2006 Expedition, Navigator F-Super Duty 250/350 2004-2006 F-150, 2006 Mark LT 5.4L 3V: Retrieve DTCs And Replace Both VCT Solenoids (Do Not Use With Any Other Labor Operations)	0.6 Hr.
140114A	2008-2010 F-Super Duty 250/350 5.4L 3V: Retrieve DTCs And Replace Both VCT Solenoids (Do Not Use With Any Other Labor Operations)	2.6 Hrs.
140114A	2007-2013 Expedition, Navigator, 2007 F-Super Duty 250/350 5.4L 3V: Retrieve DTCs And Replace Both VCT Solenoids (Do Not Use With Any Other Labor Operations)	3.1 Hrs.
140114A	2007-2010 F-150, 2007-2008 Mark LT 5.4L 3V: Retrieve DTCs And Replace Both VCT Solenoids (Do Not Use With Any Other Labor Operations)	3.5 Hrs.

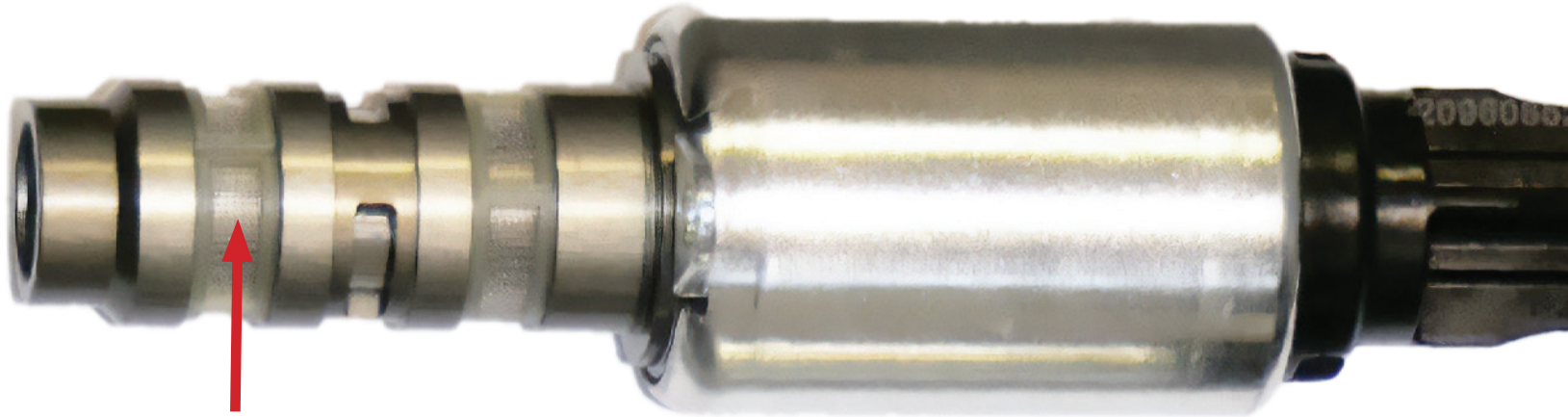
NOTE: The information contained in Technical Service Bulletins is intended for use by trained, professional technicians with the knowledge, tools, and equipment to do the job properly and safely. It informs these technicians of conditions that may occur on some vehicles, or provides information that could assist in proper vehicle service. The procedures should not be performed by "do-it-yourselfers". Do not assume that a condition described affects your car or truck. Contact a Ford, Lincoln, or Mercury dealership to determine whether the bulletin applies to your vehicle. Warranty Policy and Extended Service Plan documentation determine Warranty and/or Extended Service Plan coverage unless stated otherwise in the TSB article. The information in this Technical Service Bulletin (TSB) was current at the time of printing. Ford Motor Company reserves the right to supersede this information with updates. The most recent information is available through Ford Motor Company's on-line technical resources.

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Ford Technical Service Bulletin TSB-14-0114

OE Problem:

The oil screen often separates or the solenoids become clogged, causing a premature failure on the Ford 5.4L



Plastic Oil Screen:

Can separate or break down, clogging the solenoid

Blue Streak® by Standard® Solution:

Features an improved steel oil screen welded to the solenoid body, which won't break down or clog



Steel Oil Screen:

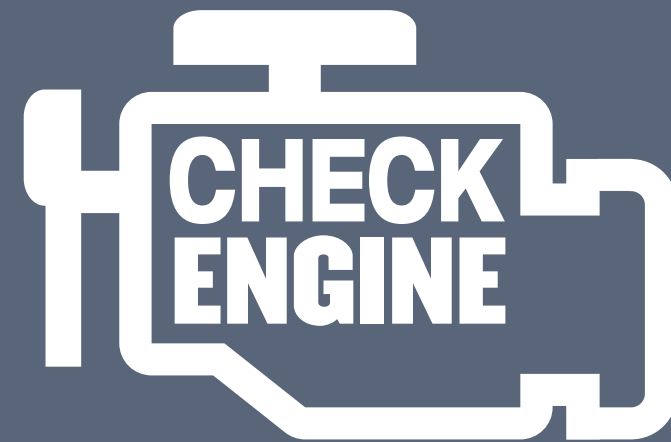
Can't separate from the body or break down like plastic



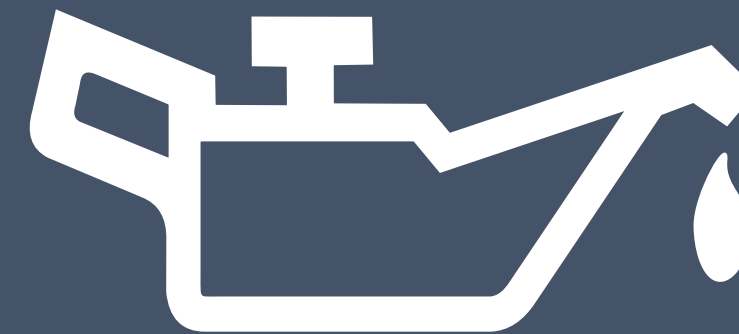
VVT Solenoids

StandardBrand.com

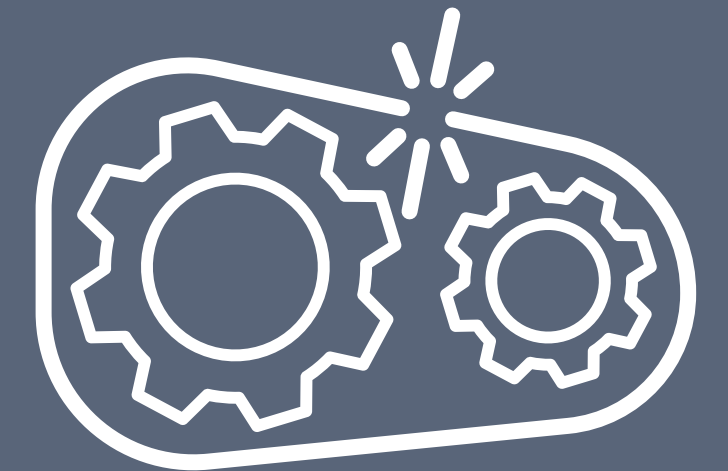
Impact on Engine Systems



Rough idle, stalling, poor acceleration, decreased fuel economy, engine noise, and a check engine light may be signs of an issue with a VVT system



Using the correct oil weight is critical to the health of any variable valve timing system



Low oil pressure will affect VVT system performance – Prior to installing new components, ensure that base engine oil pressure is within specifications



What's New

VVT Solenoids

VVT solenoids, also known as control valves or spool valves, come in a variety of designs depending on their application.

Standard® and Blue Streak® are committed to regularly introducing new VVT Solenoids, adding to our industry-leading coverage.

For the most recent applications, check the online catalog at StandardBrand.com.



VVT857

Audi Cars & SUVs
2.0L (2023-17)
VIO: 205K



VVT832

Mitsubishi Eclipse Cross
1.5L (2022, 2020-18)
VIO: 55K



VVT465

GM Cars, Trucks & SUVs
2.0L / 2.7L (2020-19)
VIO: 68K



VVT860

Volkswagen Cars
2.0L (2023-22)
VIO: 21K



VVT Solenoids

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What's New

VVT Sprockets

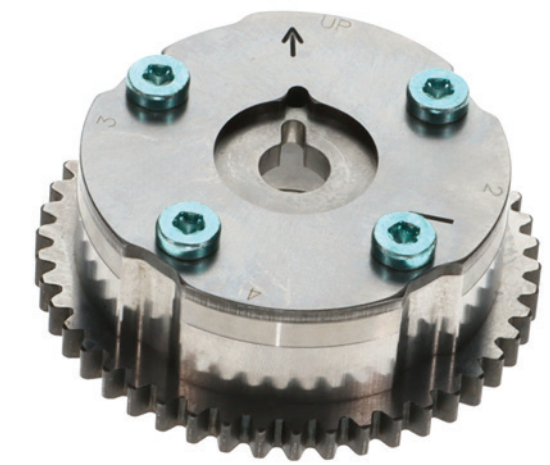
VVT Sprockets, also known as cam phasers, account for nearly 300 SKUs in Standard® and Blue Streak's ever-expanding line of VVT component coverage.

For the most recent applications, check the online catalog at StandardBrand.com.



VVT835

Volvo Cars & SUVs
2.0L (2023-14)
VIO: 721K



VVT867

Honda Cars & SUVs
1.5L (2020-16)
VIO: 2.5M



VVT850

Toyota Cars & SUVs
1.8L / 2.0L (2022-14)
VIO: 838K



VVT816

Subaru Cars & SUVs
2.0L / 2.4L (2023-18)
VIO: 1.2M



VVT Sprockets

StandardBrand.com

Top Movers: VVT Solenoids & Sprockets

IMPORT APPLICATIONS



VVT144

Honda / Acura Cars & SUVs
(2012-02)



VVT143

Nissan Cars & SUVs
(2020-13)



VVT377

Nissan / Infiniti
Cars, Trucks & SUVs
(2022-13)



VVT519

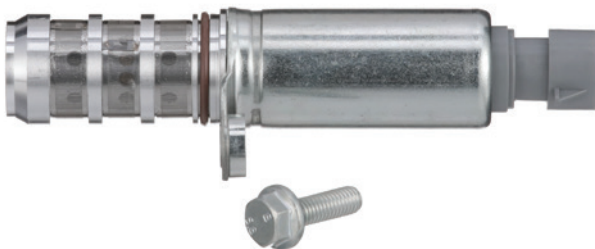
Honda Cars & SUVs
(2015-08)



VVT718

Hyundai / Kia Cars & SUVs
(2023-14)

DOMESTIC APPLICATIONS



VVT198

GM Cars & SUVs
(2017-06)



VVT199

GM Cars & SUVs
(2017-06)



VVT101

Ford / Lincoln
Cars, Trucks & SUVs
(2014-04)



VVT603

Chrysler / Dodge / Jeep / RAM
(2023-11)



VVT703

Ford / Lincoln
Cars, Trucks & SUVs
(2021-17)



VVT Components

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Related Parts

In addition to the highest quality Sprockets and Solenoids, Standard® and Blue Streak® offer the complementary parts necessary to maintain and repair today's VVT systems.



VVT Spool Filters

Spool filters can become clogged over time, hindering performance and potentially causing damage to the solenoids

Standard's replacement VVT Spool Filters allow technicians to service the filter and gaskets without replacing solenoids

Available for popular Honda and Acura applications through 2019



VVT Chain Tensioner Kits

Worn chain tensioners can cause a vehicle to run poorly and can even lead to a catastrophic engine failure

Standard's VVT Chain Tensioner Kits include a new chain tensioner, gasket and seal for a complete repair

Available for popular Audi and VW vehicles with high failure rates

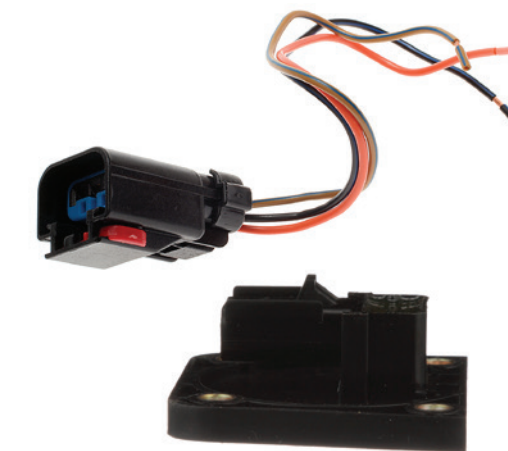


VVT Position Sensor Magnets

Newer VVT systems may also incorporate adjuster magnets

Standard's VVT Position Sensor Magnets are a drop-in replacement part and include new seals to help prevent oil contamination

37 SKUs available with coverage through 2023



Camshaft & Crankshaft Position Sensors

Grime, water damage and bad wiring can all cause camshaft and crankshaft sensors to fail

Each Standard® Cam and Crank Sensor undergoes a testing regimen that includes a 35-hour vibration test, chamber test, and more to ensure durability

More than 1,000 Cam and Crank Sensors available for import and domestic vehicles



Product Spotlight

VVT is a complex system, and solenoid designs can vary from application to application. The Honda / Acura 3.5L engine features a solenoid with an upper and lower portion.

The upper portion contains the moving elements and electric components, and is the part that typically fails, while the lower portion is the cast aluminum housing.

Blue Streak® VVT282UP contains the upper portion as well as the required seals and hardware for an easy installation.

Blue Streak® VVT282 is also available for a complete solenoid replacement.

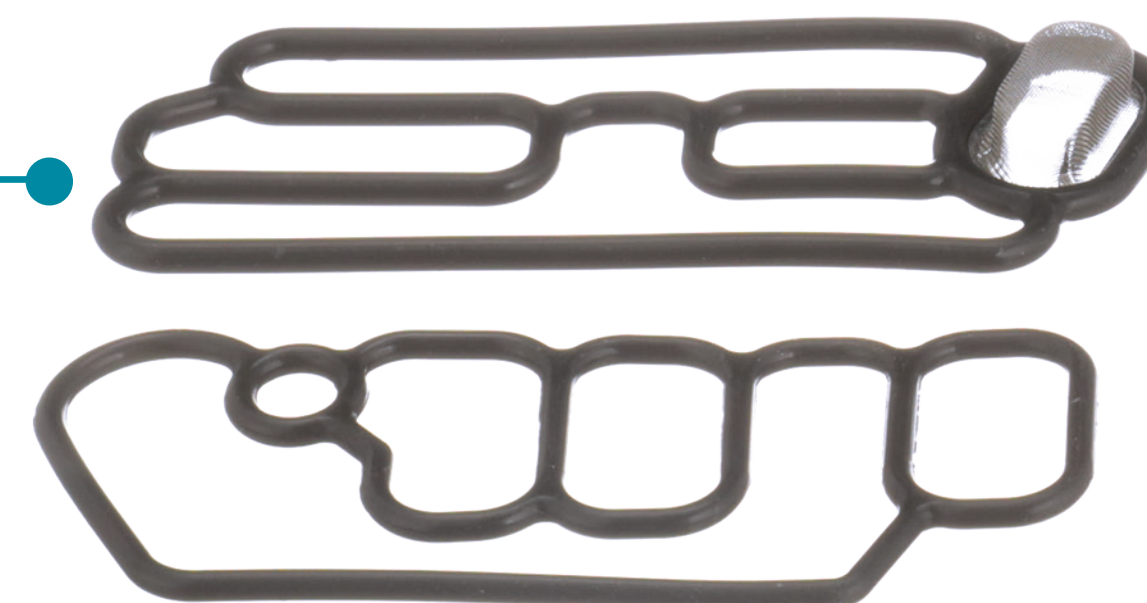
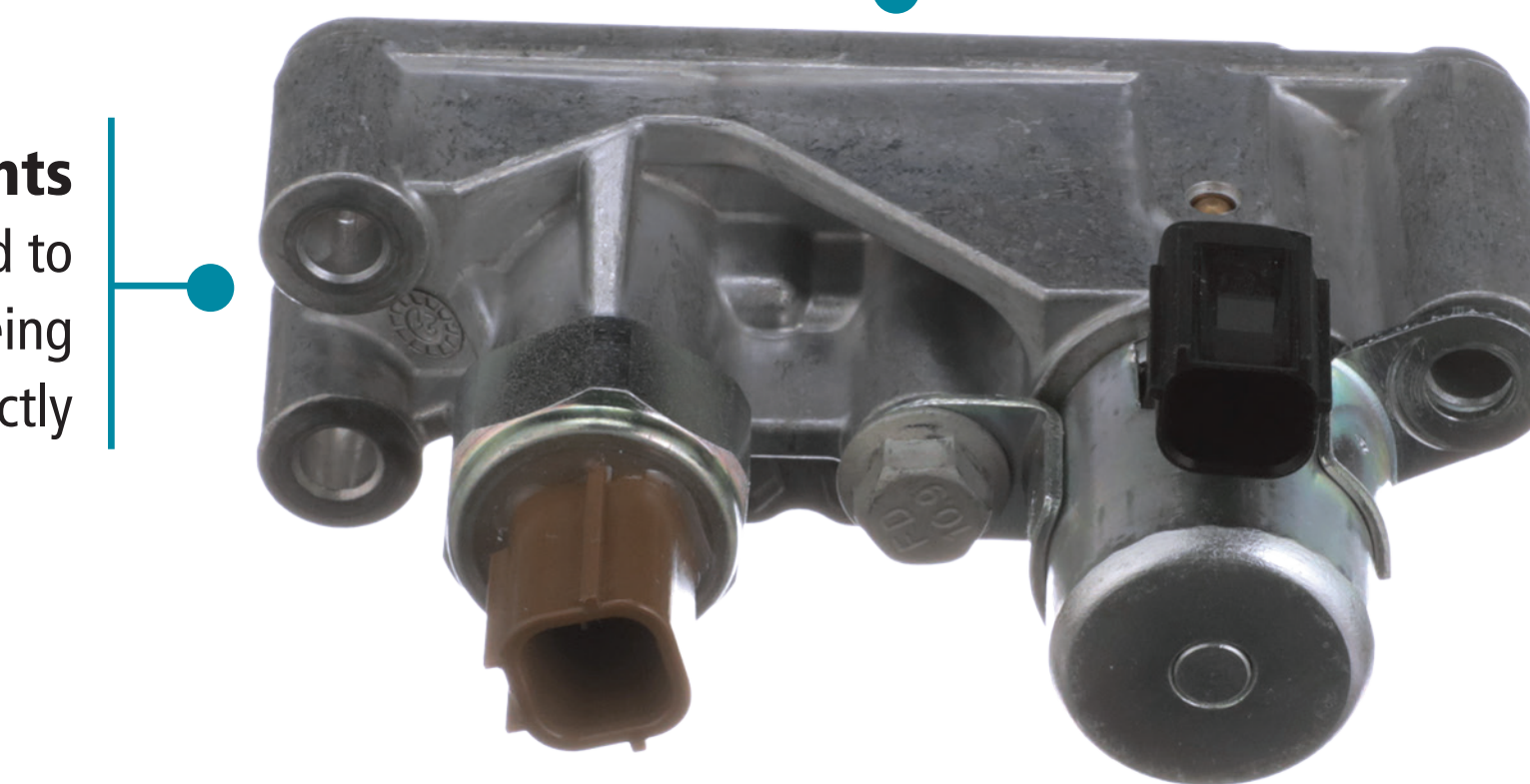
Precision Manufactured
in our state-of-the-art
Poland facility

Design Improvements
Retaining surface increased to
prevent the bushing from being
pressed incorrectly

Simplified Installation
Installation requires removing only
three screws, while replacing the
entire solenoid requires disassembling
the intake manifold, valve cover, and
valve train components

New Seals Included
which are easily replaced
during installation

New Hardware Included
so the original hardware
doesn't need to be reused



VVT282UP

Acura / Honda 3.5L
(2016-08)



VVT Solenoids

StandardBrand.com

Complete Timing Repair Kits

Ford 5.4L engines feature highly technical VVT systems which are susceptible to failure. They typically fail due to low engine oil levels, poor oil circulation, or oil and filter change irregularities.

Blue Streak® offers a Complete Timing Repair Kit to solve this OE problem.

VVT420K Complete VVT Repair Kit Ford / Lincoln (2014-02) VIO: 3.1M



VVT Kit Components

- | | |
|--|-------------------------------|
| 1 – VVT Sprockets | 6 – Drive Gear Sprocket |
| 2 – VVT Solenoids | 7 – Crankshaft Position Wheel |
| 3 – Timing Chain Tensioners | 8 – Crankshaft Seal |
| 4 – Timing Chains | 9 – Gaskets |
| 5 – Timing Chain Guides & Tensioner Arms | |



VVT Systems

StandardBrand.com

Engineering Improvements

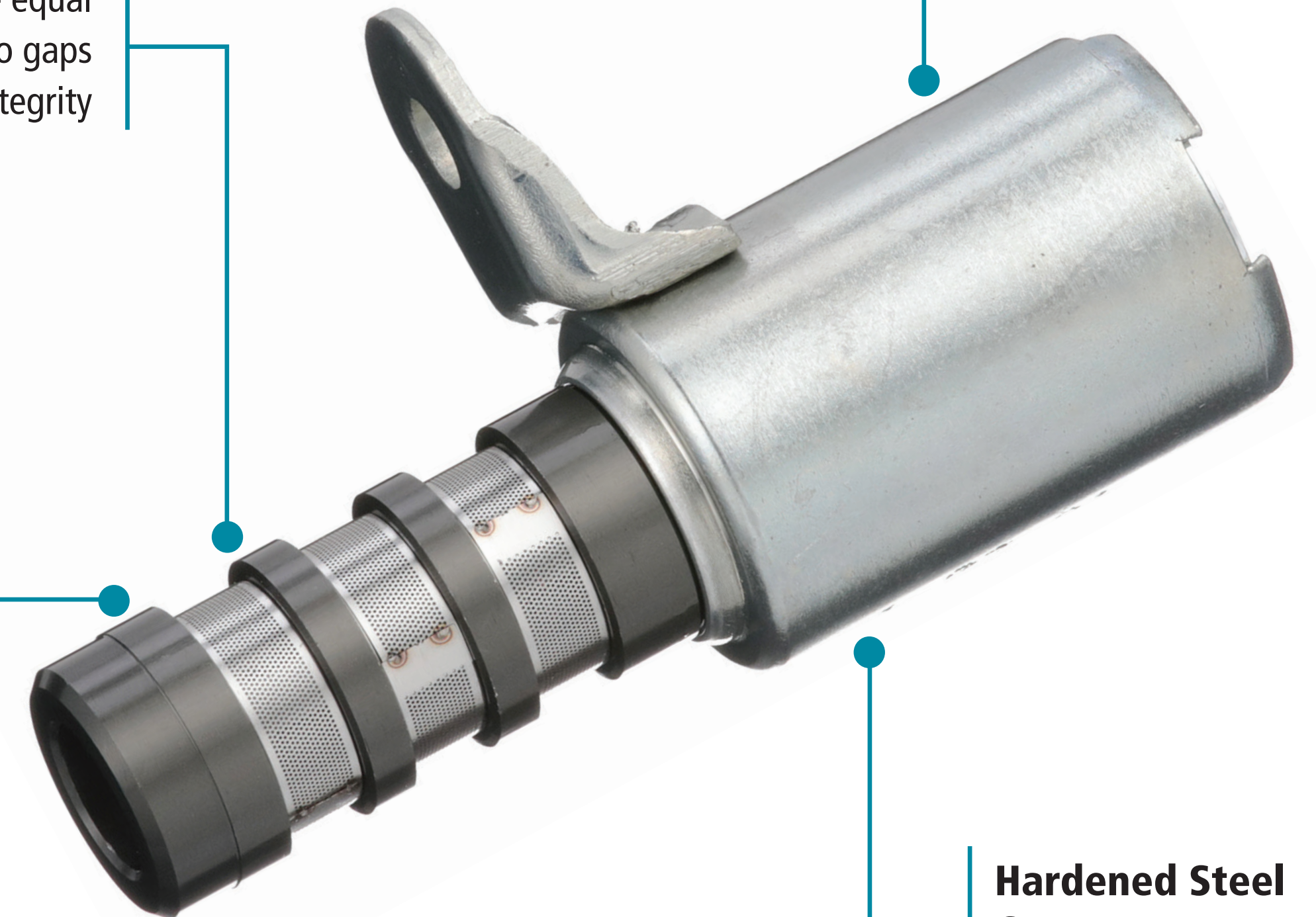
Generally located on and/or around the cylinder head, VVT solenoids meter the oil flow to control the actuation of the VVT sprocket.

Each Standard® and Blue Streak® VVT Solenoid features anodized steel componentry, which limits sludge buildup and protects against sticking. Standard® and Blue Streak® Solenoids also feature premium O-rings and gaskets to prevent oil leaks, as well as an OE-matching harness connector.

Precision Engineered
Designed for optimum performance and a long service life

Welded Filters have equal overlapping diameters with no gaps to maintain structural integrity

Welded Reinforcement
ensures a stronger connection between screen and body



Hardened Steel Componentry
limits sludge buildup

VVT109

Ford Cars, Trucks & SUVs
(2023-11)



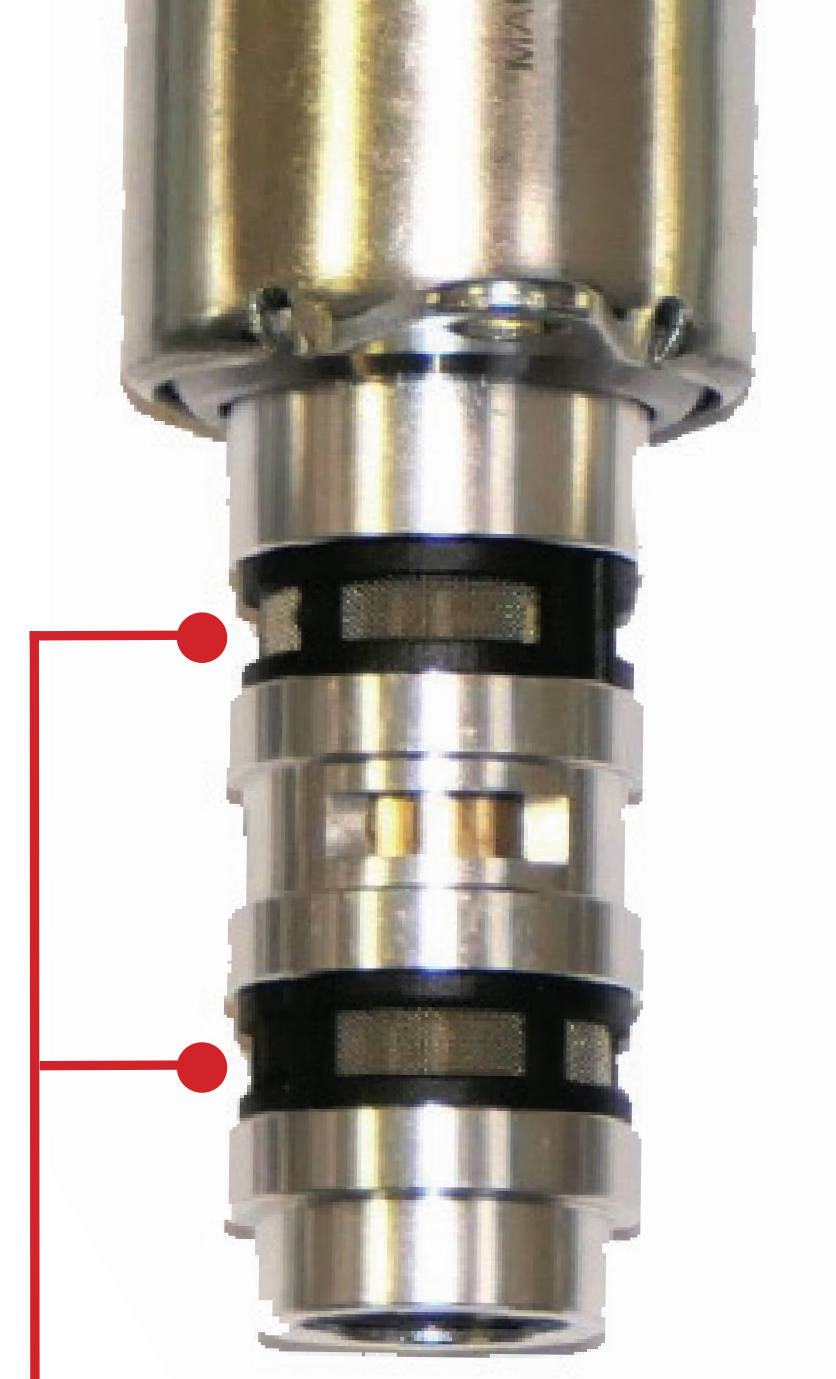
VVT Solenoids

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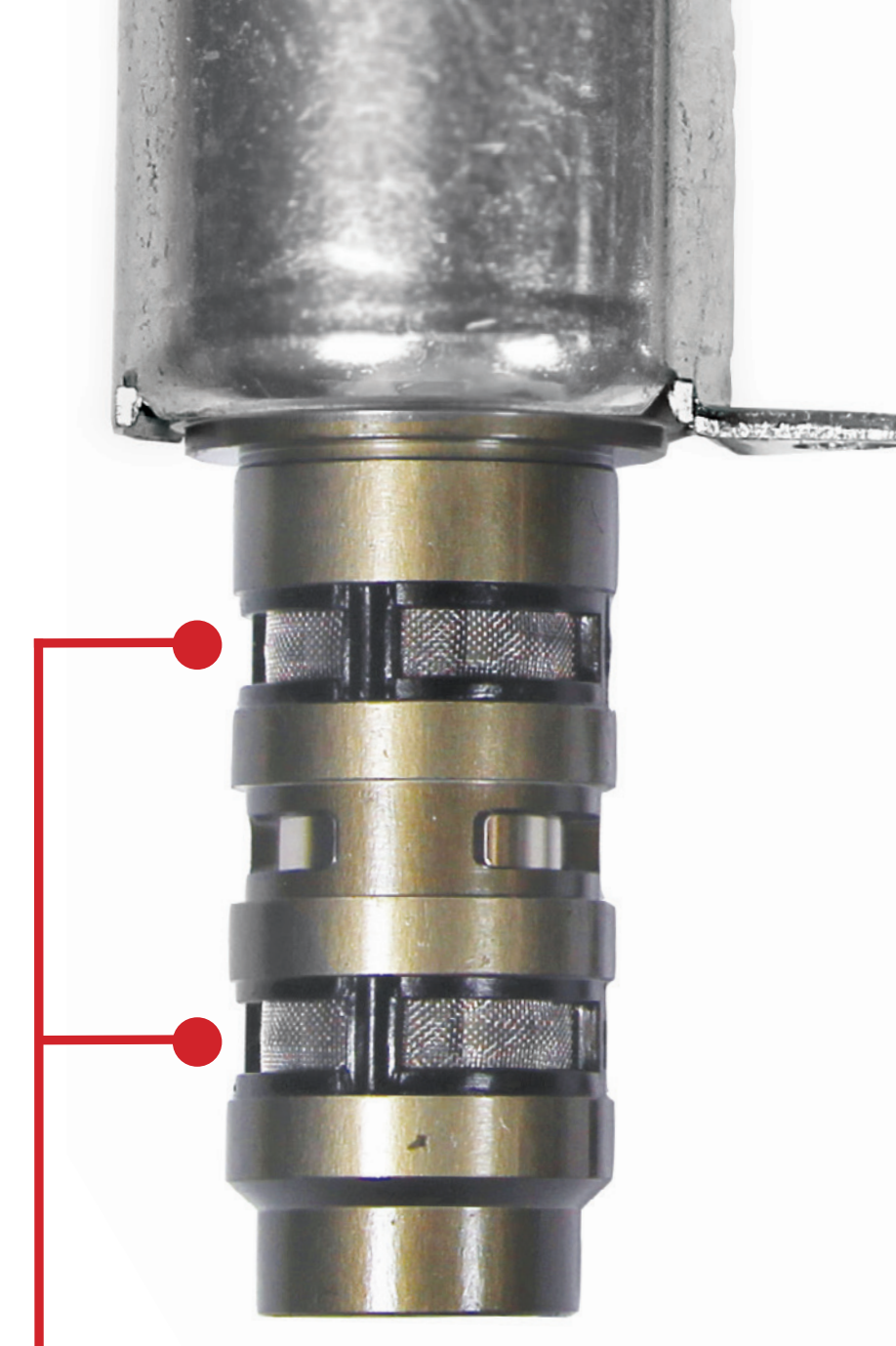
Engineering Improvements

Blue Streak® VVT Solenoids feature design improvements over the original and the competition.

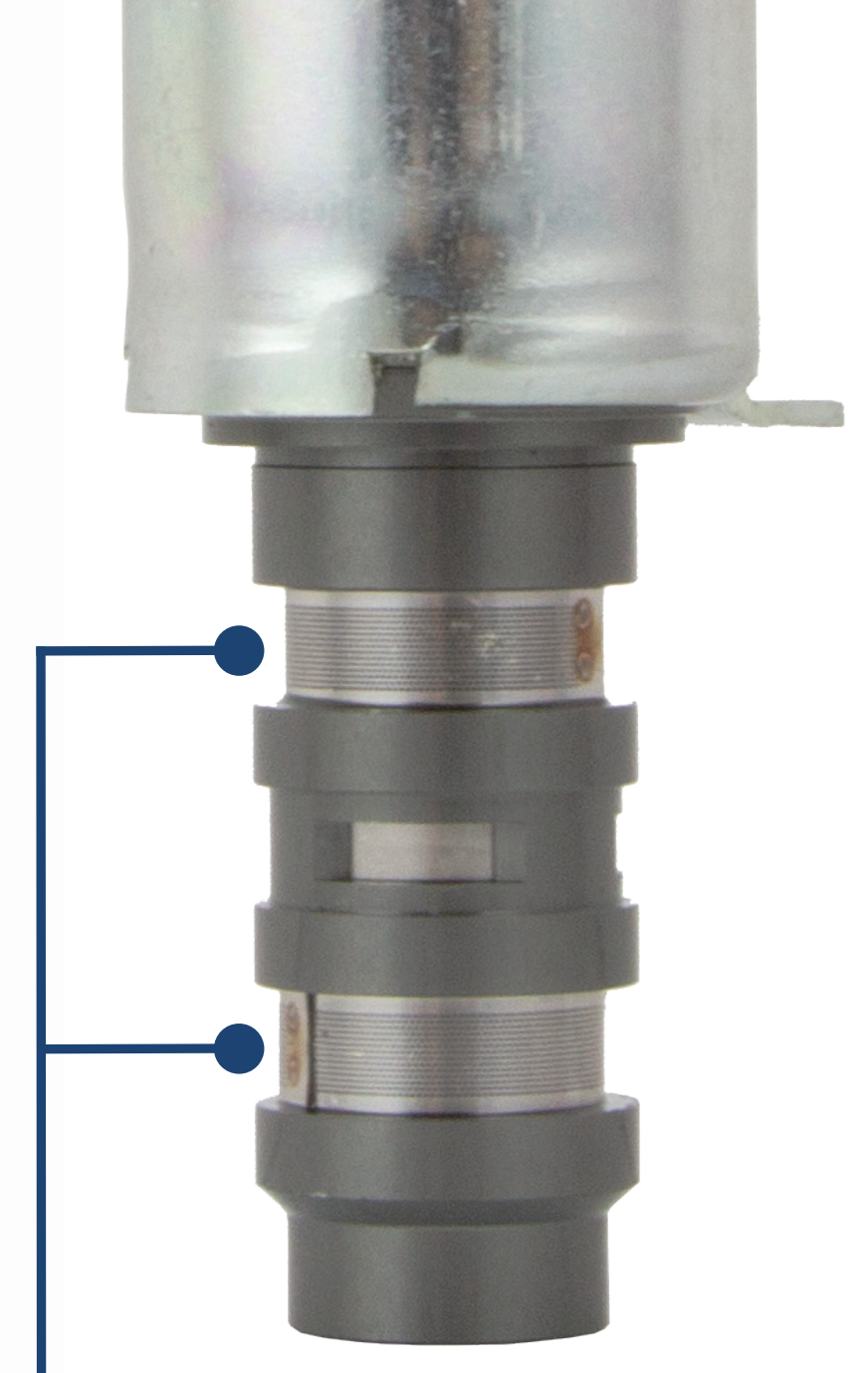
For instance, OE and competitors' solenoids use plastic on the oil screen, which is prone to deteriorating and separating, failing to hold the screen to the body. Our improved screen stamp and welded reinforcement are the result of Standard's commitment to high-quality design and rigorous testing.



**Competition
uses plastic**



OE uses plastic



**Blue Streak® uses a
reinforced metal screen**

Reinforced Plunger Design



**Competitor design has no
reinforcement**



**Blue Streak® features a reinforced
plunger and spring**



VVT Solenoids

StandardBrand.com

Engineering Improvements

Blue Streak® VVT Solenoids feature a stainless steel shaft for a durable and more reliable solution while the OE and competitor units use lesser materials prone to deformation and wear.

In addition, Blue Streak® VVT Solenoids include a groove on the armature for improved lubrication, allowing for faster valve switching and decreased wear of the armature, while competitors do not use grooves for lubrication, resulting in slower valve switching and accelerated wear.

Durable Shaft & Lubrication Grooves

The Blue Streak® VVT198 uses a stainless steel shaft, pressed all the way to the armature for durability and reliability

Blue Streak® & OE:
Groove on the armature for improved lubrication

OE: Thin formed metal sheet shaft – prone to deformation, and change of valve characteristics

Competitor 1: Aluminum shaft – which can deform over time and alter valve timing

Competitor 1 & Competitor 2:
No grooves for lubrication

Competitor 2: Plastic shaft – prone to breaking, cracking, or premature wear



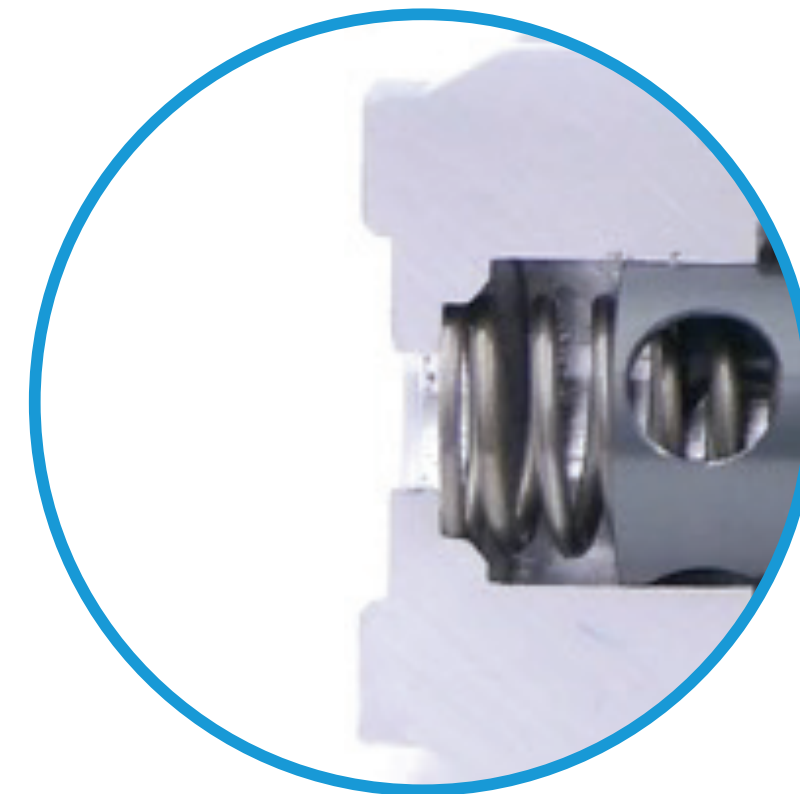
VVT Solenoids

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Engineering Improvements

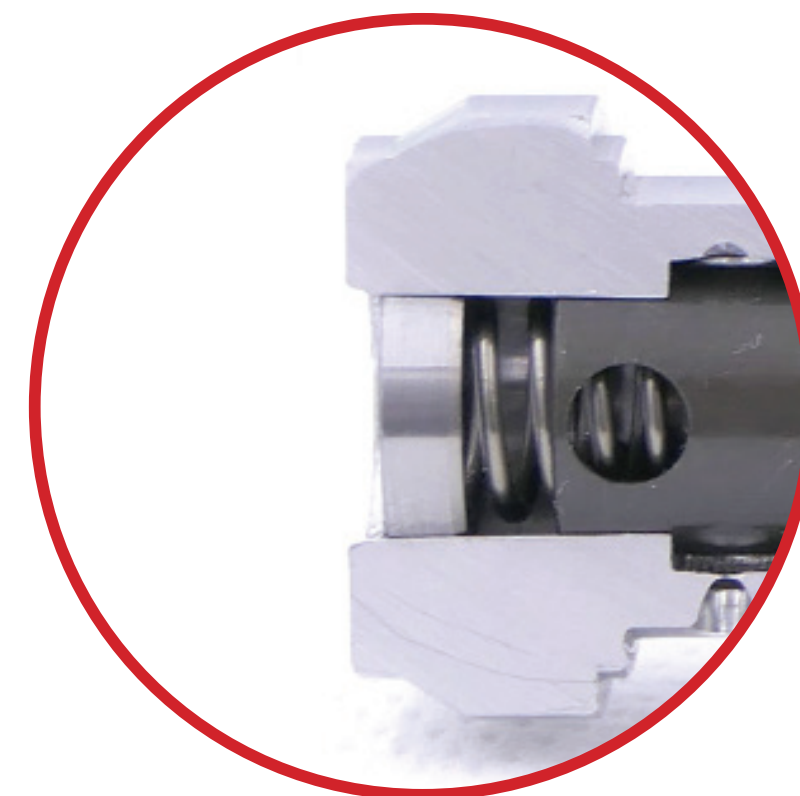
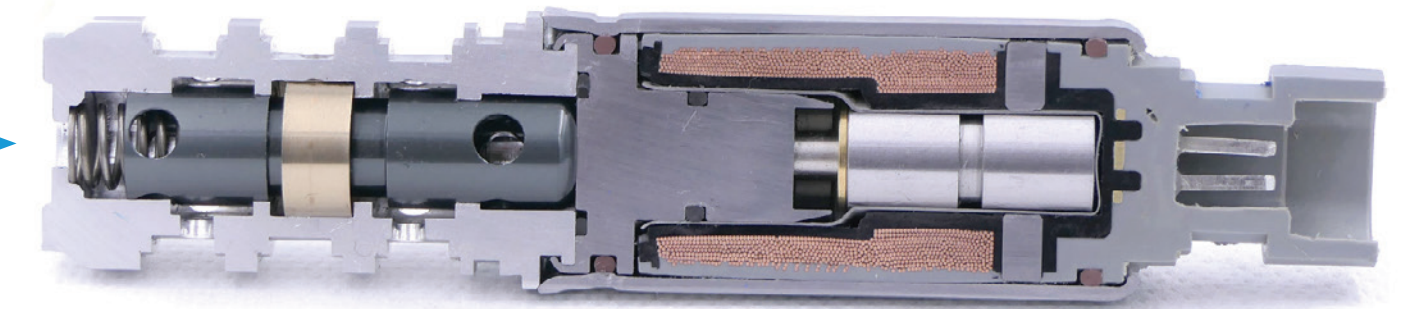
The OE and competitors' VVT solenoids use pressed rings for spring support that can fall apart over time.

Blue Streak® VVT Solenoids feature a closed valve body for spring support, which keeps the spring intact, even after millions of valve switches.



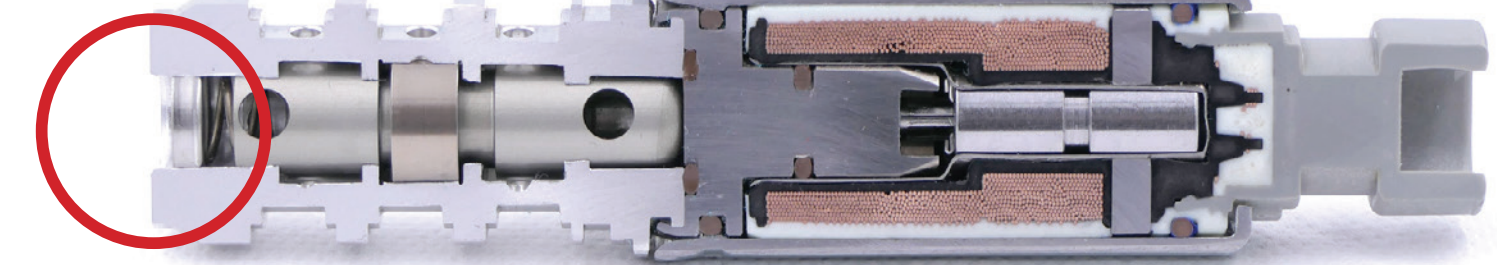
Solid Valve Body

Blue Streak®

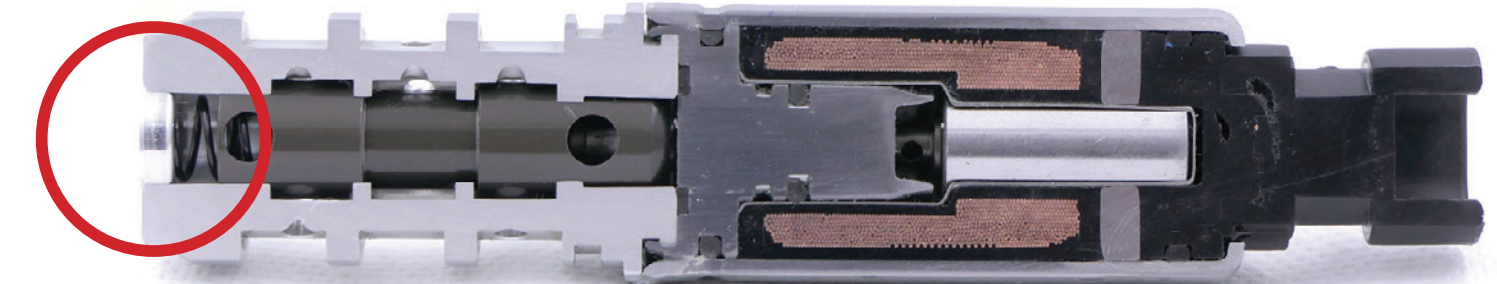


Pressed Ring

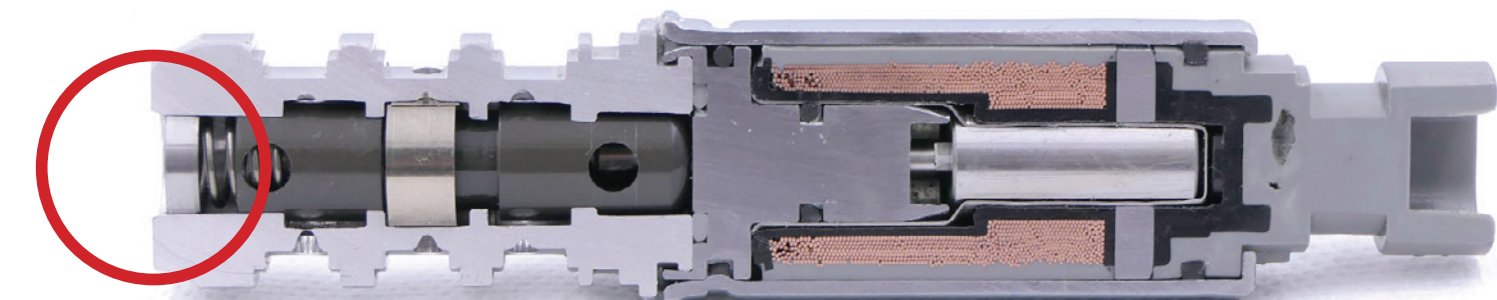
OE



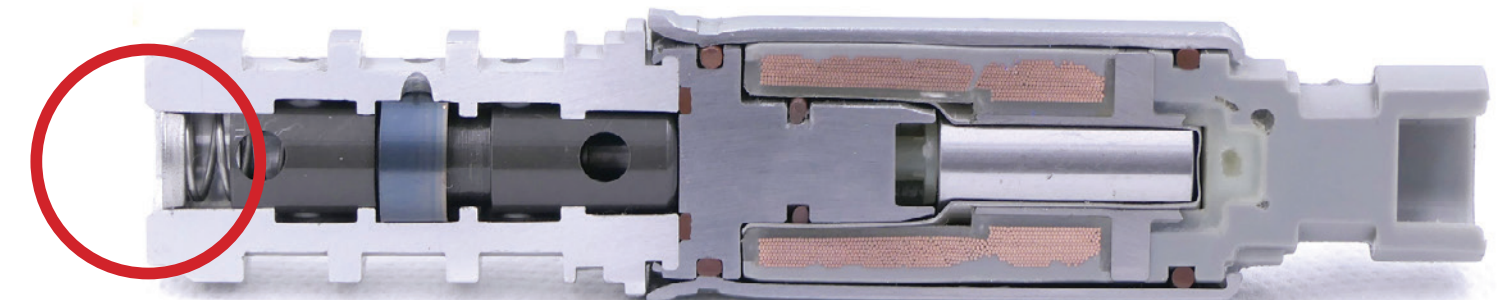
Competitor 1



Competitor 2



Competitor 3



VVT Solenoids

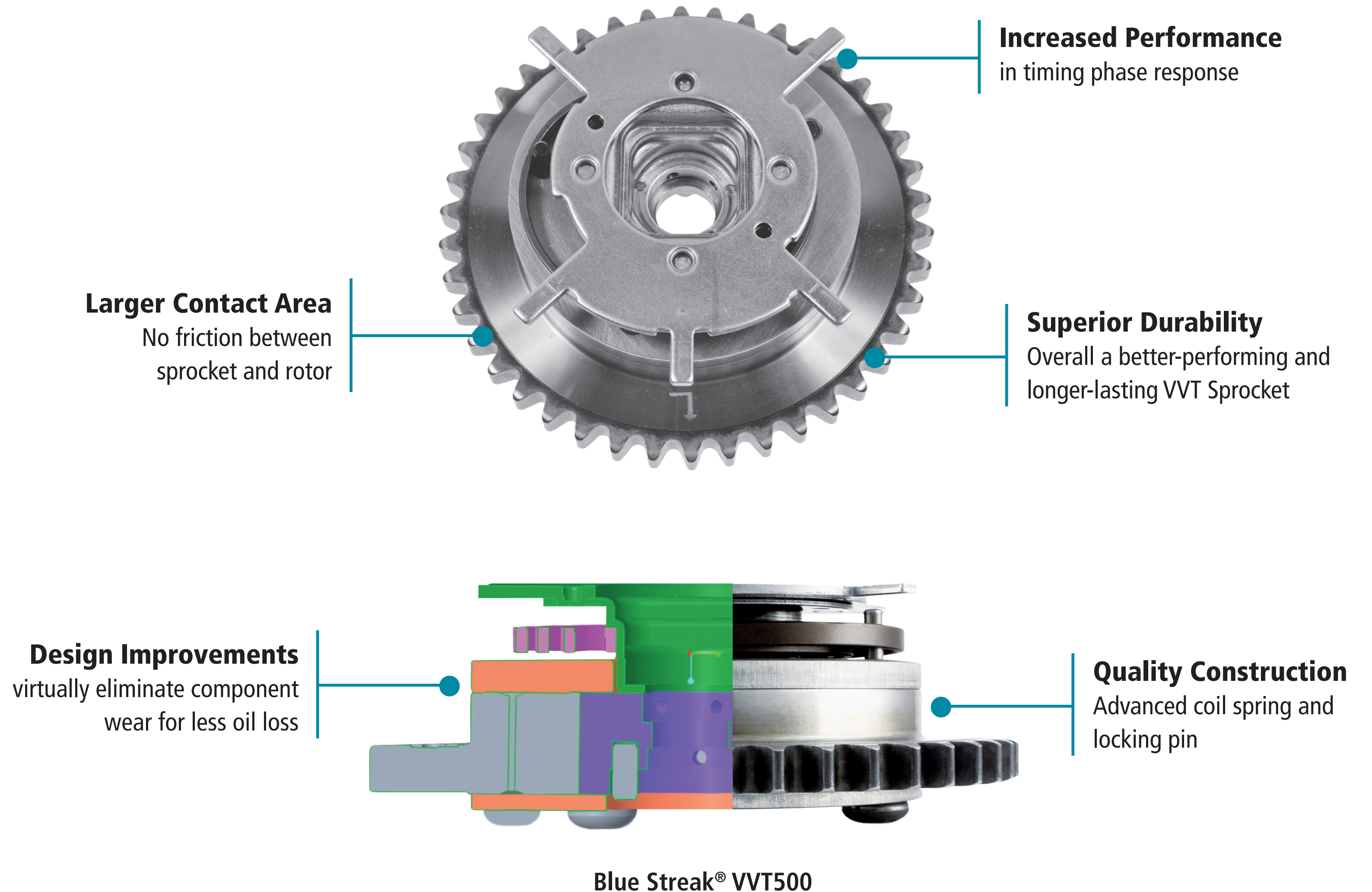
StandardBrand.com

Engineering Improvements

Located on the camshaft, sprockets help maximize horsepower and torque curves, reducing emissions and improving vehicle efficiency. Standard® engineers have designed numerous improvements into our most popular VVT Sprocket for enhanced performance and long-lasting durability.

To ensure proper performance, Standard® and Blue Streak® VVT Sprockets are direct-fit OE replacements and meet tight dimensional tolerances to improve internal sealing, minimize oil drain back, and reduce frequency of PCM correction. The result is a better-performing, longer-lasting Sprocket.

The Blue Streak® Advantage



VVT Sprockets

StandardBrand.com

Engineering Improvements

Blue Streak® matches the original in all key tolerances and then improves on it with an all-metal integrated machined design – no paddle inserts to wear out, larger contact area, faster response times and longer service life.

The OE metal paddles may produce iron shavings that impede performance and shorten sprocket wear.

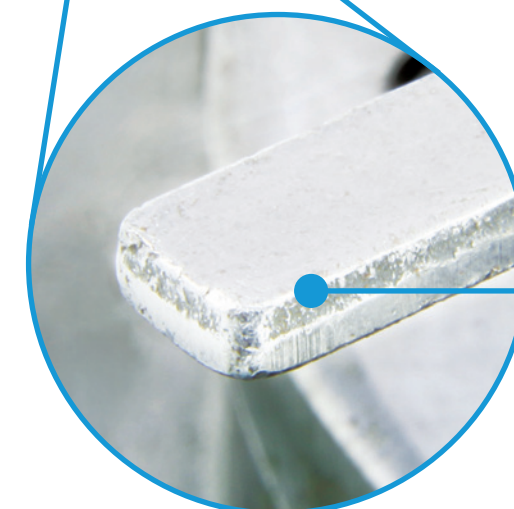
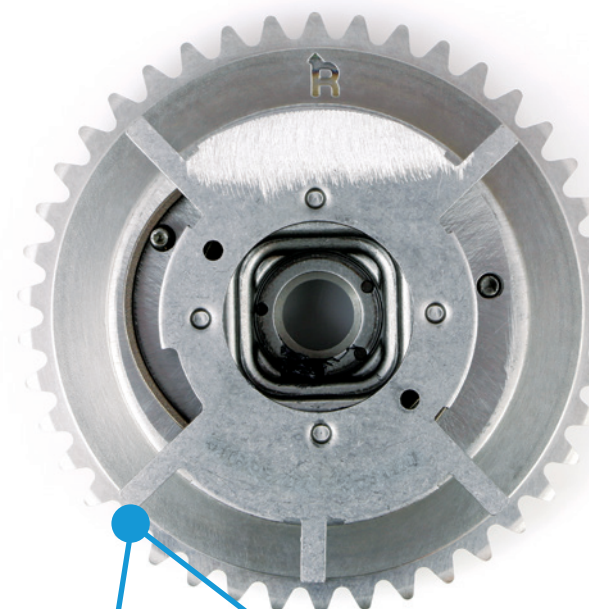
Competitor D uses plastic paddle inserts that wear easily and an “R” chamfer which can affect the timing signal.

OE



Original - Metal Paddles

Produce iron shavings, paddles wear rapidly



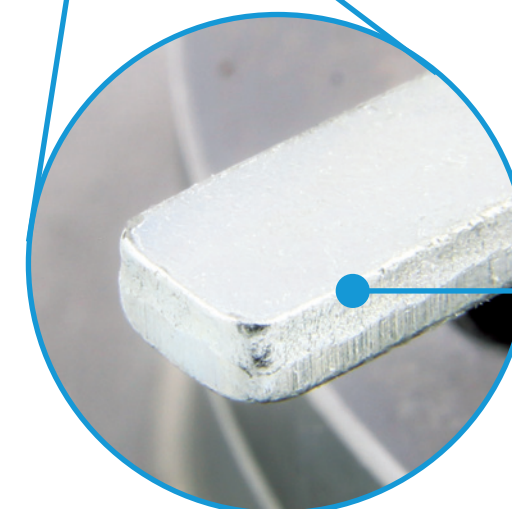
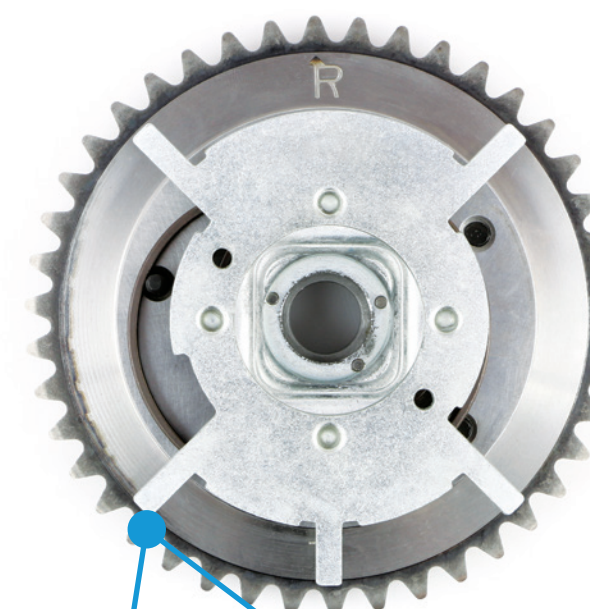
No R chamfer on signal-driven area

Blue Streak®



Best – Integrated Design

Larger contact area with no paddle to wear out



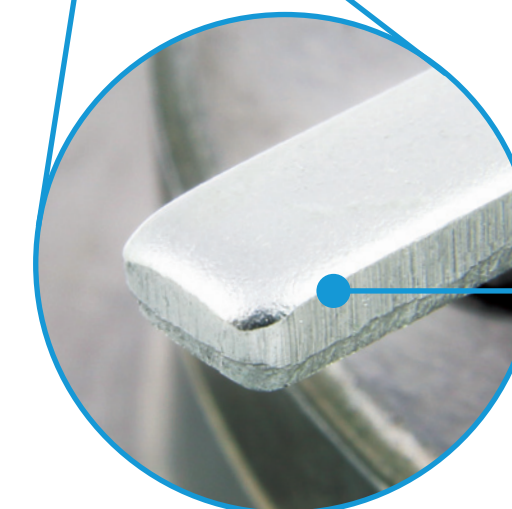
No R chamfer on signal-driven area

Competitor D



Inferior – Plastic Paddles

Components wear easily



R chamfer on signal-driven area

Source: SMP Testing Lab, 2020



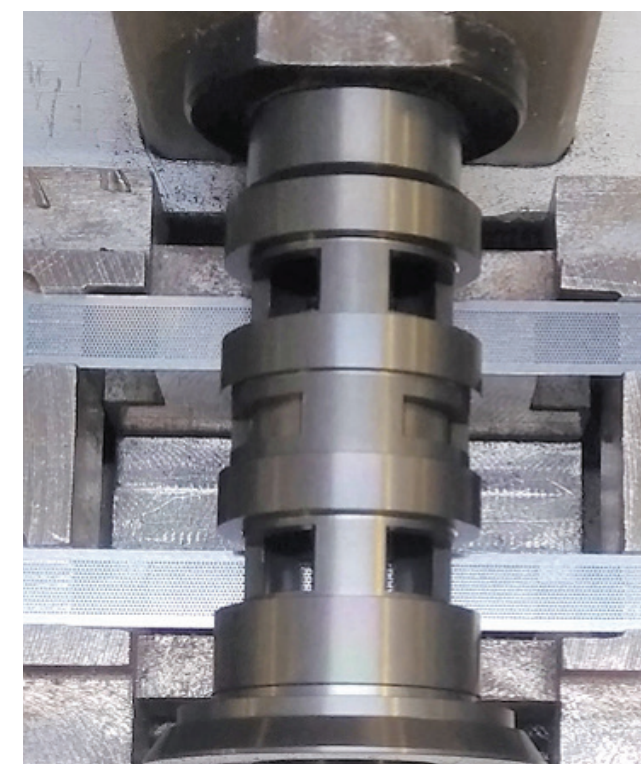
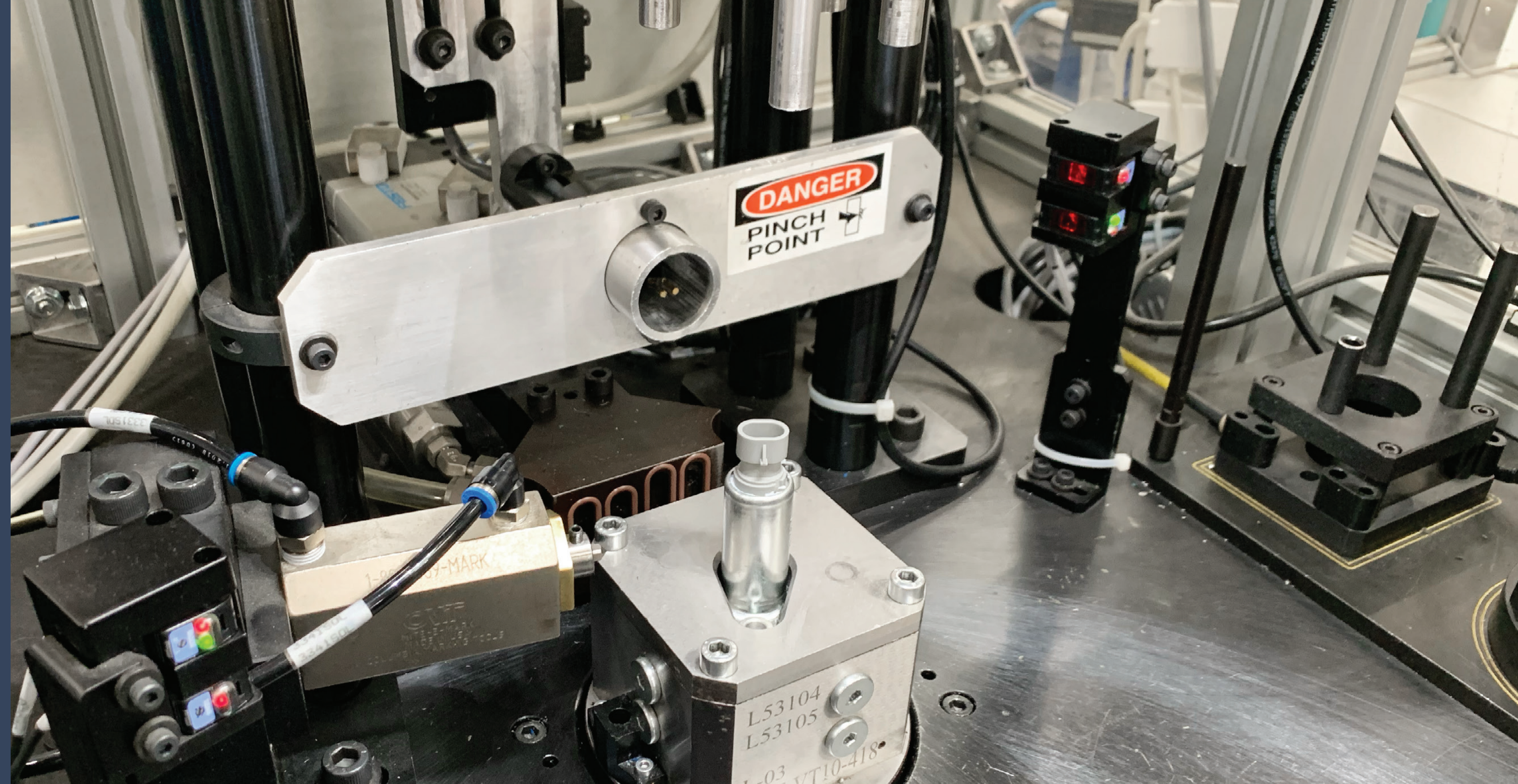
VVT Sprockets

StandardBrand.com

Manufacturing

Standard® and Blue Streak® VVT components are designed and manufactured at our IATF 16949-certified facility in Bialystok, Poland. This facility is equipped with the most high-tech manufacturing equipment available to produce our VVT Solenoid housings.

Controlling the entire manufacturing process offers significant advantages, resulting in consistent, high-quality outputs, minimized errors and defects, improved customer satisfaction, and enhanced Standard® brand reputation.



Commitment to Continuous Improvement

Our dedication to continuous improvement practices in design, engineering and manufacturing allows us to make enhancements to the OE design, while maintaining complete control over each Standard® and Blue Streak® VVT component.



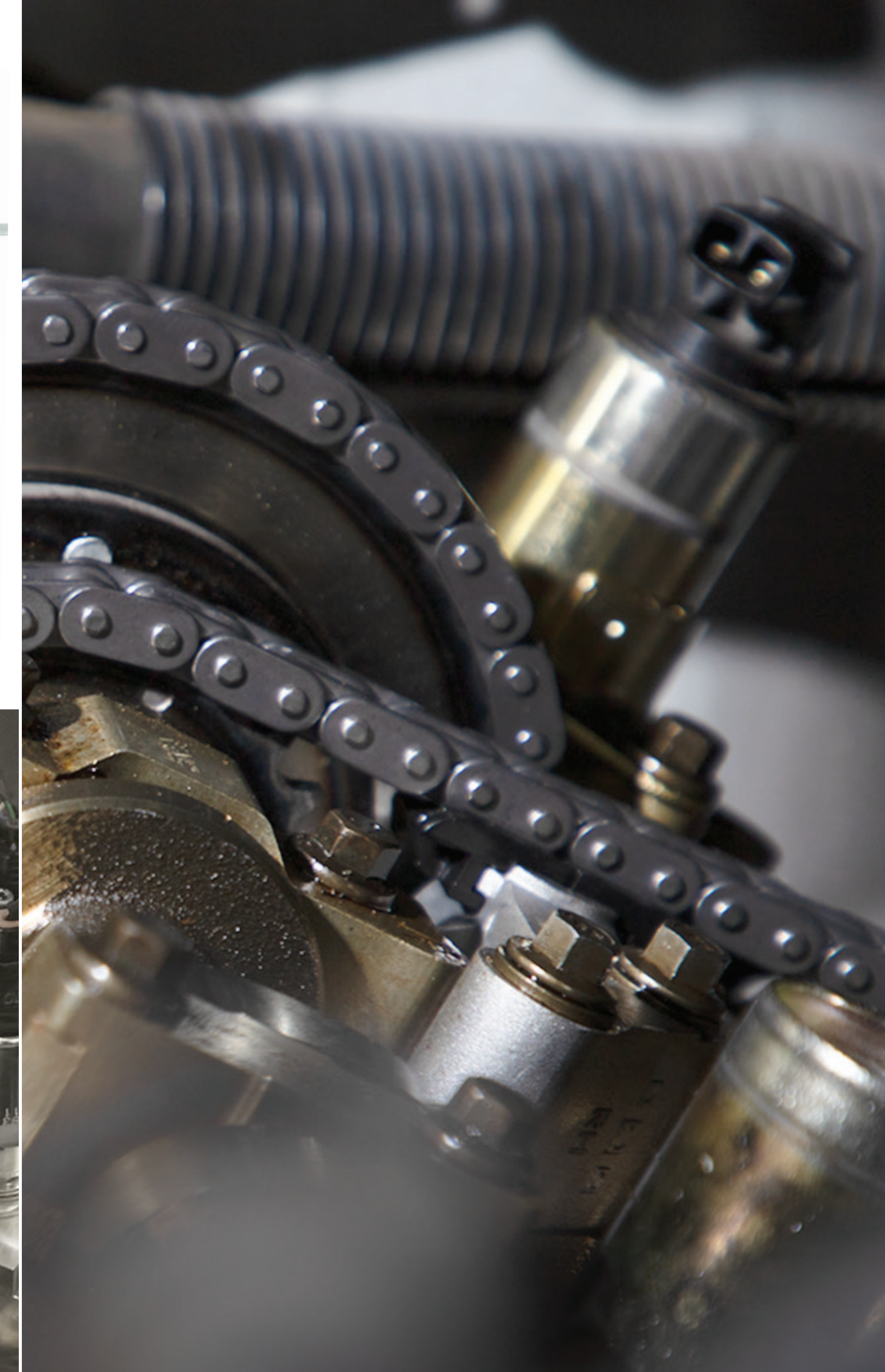
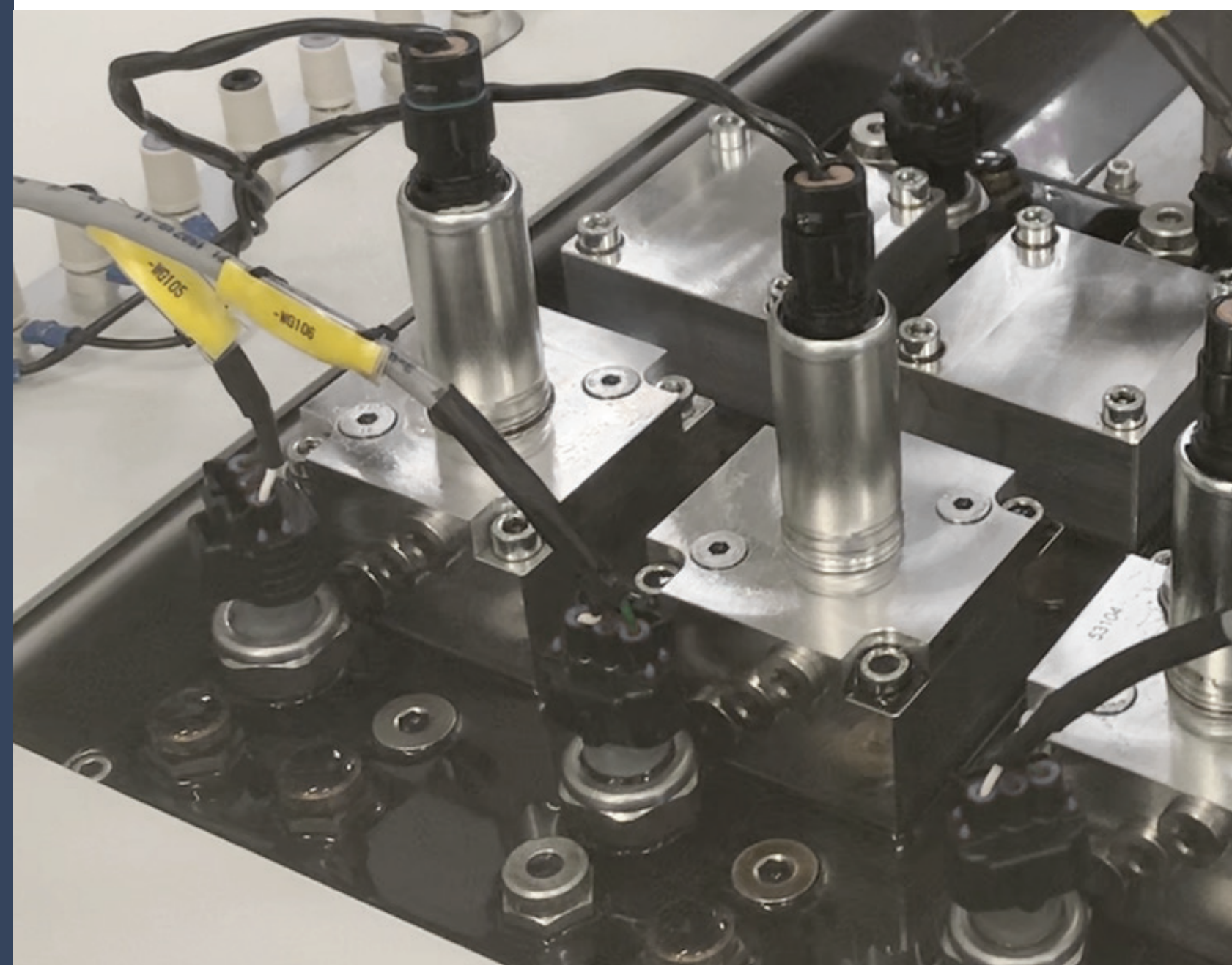
VVT Sprockets

StandardBrand.com

Testing and Validation

Standard®-manufactured VVT Solenoids and Sprockets undergo extensive measurement and life testing, plus a full spectrum of environmental analysis. This regimen includes thermal shock, thermal cycling, salt spray, vibration, storage tests, dirty oil tests, and more. Additionally, our VVT components are tested on vehicles at our Testing Center in Texas to ensure proper fit and performance.

The result is a line of premium VVT components that perform flawlessly and stand up to real-life conditions.



VVT Components

StandardBrand.com

Standard[®] Pro Training Tech Tips

As experienced ASE-certified automotive technicians themselves, Standard[®] Pro Trainers are experts in VVT system technology. Here's what they say to look out for during a VVT component install.



Always test engine oil pressure at warm idle to ensure it is within spec – Low oil pressure will result in VVT components not operating as expected



If one solenoid or sprocket fails, it's likely the other VVT components are nearing the end of their service life too – It's suggested to replace both solenoids and sprockets at the same time and inspect/replace all related timing chain components in the VVT system



Always change the engine oil and filter when replacing a VVT solenoid or sprocket



Standard® Professional Training

Award-Winning In-Person, Live Virtual, and Online Learning

Standard® Pro Training delivers accredited classes that educate technicians in the latest automotive repair technologies, and techs can earn CEU credits.

An extension of Standard® training, our extensive YouTube video library has over 650 technical and installation videos.



Available Classes

Diagnosing GM Variable Cam Timing
Ford Variable Valve Timing
Modern Valvetrains
Nissan VVT Diagnostics
Variable Valve Timing Fundamentals

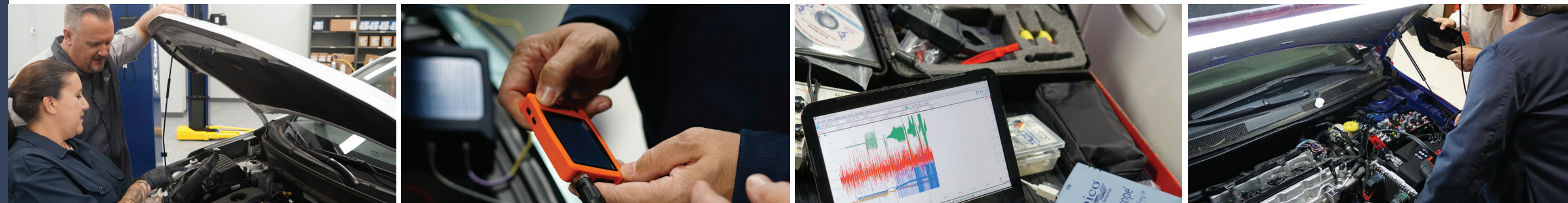


Available Classes

Advanced Driveability Diagnostics
Ford EcoBoost
Ignition and Cam /
Crank Synchronization
Labscope Power-User
Toyota / Lexus Diagnostics
Unleash The Power of Your
Scan Tool



For information on replacing VVT and components, search “VVT” on the **StandardBrand** YouTube channel



VVT Components

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